



SHRI VIDHYABHARATHI MATRIC HR.SEC.SCHOOL
SAKKARAMPALAYAM, AGARAM (PO), ELACHIPALAYAM
TIRUCHENGODE (TK), NAMAKKAL (DT) PIN-637202

Cell: 99655-31727, 94432-31727

COMMON QUARTERLY EXAMINATION 2018

STD: XI

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SUBJECT: MATHEMATICS

ANSWER KEY

MARKS : 90

SECTION – I		
Q.No	ANSWER KEY	MARKS
1.	d) $(-\infty, 1]$	1
2.	** (Question wrong)	1
3.	d) f is neither one - one nor onto	1
4.	c) x	1
5.	a) $\frac{-1}{2}$	1
6.	b) $[2, \infty)$	1
7.	a) 2	1
8.	b) $(-\infty, -3] \cup [7, \infty)$	1
9.	a) 0	1
10.	c) $\frac{-a}{b}$	1
11.	c) $\frac{44}{117}$	1
12.	b) $2x, \frac{1}{x}$	1
13.	b) 3^4	1
14.	b) $\left(\frac{1}{2}\right)^n \times 2nc_n \times np_n$	1
15.	a) 2520	1
16.	a) $\frac{9!}{(2!)^3}$	1
17.	d) $10c_6 2^{10}$	1
18.	d) 20	1
19.	d) 309	1
20.	a) 3	1
SECTION – II		
21.	$n(A \Delta B) = n(A \cup B) - n(A \cap B)$ $n(A \Delta B) = 10 - 3 = 7$ $n(p(A \Delta B)) = 2^7 = 128$	1 1
22.	<u>Reflexive:</u> If $m - m = 0 \Rightarrow mRm$	

	<p>R is reflexive</p> <p><u>Symmetric:</u></p> <p>Let $mRn \Rightarrow m-n=12k$, k is integer</p> $n-m = 12(-k)$ nRm <p>R is symmetric.</p> <p><u>Transitive:</u></p> <p>Let $mRn \Rightarrow m-n=12k$</p> <p>Let $nRp \Rightarrow n-p=12l$</p> $m-p = 12k + n-n + 12l$ $= 12(k+l)$ mRp <p>R is transitive.</p> <p>R is equivalence relation.</p>	1
23.	<p>Domain = $\mathbb{R} - \{5\}$</p> <p>Range = $\{-1\}$</p>	1 1
24.	$\sqrt{6-4x-x^2} = x+4, \quad x+4 \geq 0$ $x^2 + 6x + 5 = 0$ $x = -5(\text{not possible}) [\because x \geq -4]$ $x = -1$	1 1
25.	$\cos 105^\circ = \cos(60^\circ + 45^\circ)$ $= \cos 60^\circ \cos 45^\circ - \sin 60^\circ \sin 45^\circ$ $= \frac{1-\sqrt{3}}{2\sqrt{2}}$	1 1
26.	$\tan 2x = -\cot\left(x + \frac{\pi}{3}\right)$ $= \tan\left(\frac{\pi}{2} + x + \frac{\pi}{3}\right)$ $= \tan\left(\frac{5\pi}{6} + x\right)$ $x = n\pi + \frac{5\pi}{6}, n \in \mathbb{Z}$	1 1
27.	$\sin 100^\circ + \cos 100^\circ = \sin 100^\circ + \cos(90^\circ + 10^\circ)$ $= \sin 100^\circ - \sin 10^\circ$ $= 2 \cos 55^\circ \sin 45^\circ$ $= \sqrt{2} \cos 55^\circ$	1 1
28.	$\frac{10!}{(10-r+1)!} = 2 \times \frac{6!}{(6-r)!}$ $(11-r)(10-r)(9-r)(8-r)(7-r) = 7 \times 6 \times 5 \times 4 \times 3$ $r = 4$	1 1
29.	<p>Number of selection = $4C_3 \times 48C_2$</p> $= 4 \times 1128 = 4512$	1 1
30.	$9^7 = (10-1)^7$	1

	$= 7C_0(10)^7 - 7C_1(10)^6 + 7C_2(10)^5 - 7C_3(10)^4$ $+ 7C_4(10)^3 - 7C_5(10)^2 + 7C_6(10)^1 - 7C_7(10)^0$ $= 4782969$	1
SECTION – III		
31.		3
32.	$f(x) = f(y)$ $\frac{x}{x^2-1} = \frac{y}{y^2-1}$ $xy^2 - x - yx^2 + y = 0$ $(y-x)(xy+1) = 0$ $x = y, xy = -1$ $f(x) = f(y) \Rightarrow (2, -\frac{1}{2}), (7, -\frac{1}{2}), (-2, \frac{1}{2}) \dots$ $f(2) = f(-\frac{1}{2}) = \frac{2}{3}$ <p>Hence not a 1 – 1 function</p>	1 1 1
33.	<p>Let $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y} = k$</p> $x = e^{k(y-z)}, y = e^{k(z-x)}, z = e^{k(x-y)}$ $xyz = e^0 = 1$	1 1 1
34.	$ x = y$ $\frac{y-1}{y-3} \geq 0, y \geq 1, y > 1$ <p>critical points are -3, -1, 1, 3</p> <p>Intervals $(-\infty, -3), (-3, -1), (-1, 1), (1, 3), (3, \infty)$</p> <p>The solution set is $(-\infty, -3], [-1, 1][3, \infty)$</p>	1 2
35.	$A + B = 45^\circ$ $\tan(A + B) = \tan 45^\circ$ $\tan A + \tan B = 1 - \tan A \tan B$ $LHS = (1 + \tan A)(1 + \tan B)$ $= 1 + \tan A + \tan B + \tan A \tan B$ $= 2$	1 1 1
36.	$\cos B = \frac{a^2 + c^2 - b^2}{2ac} = \frac{44}{64}$ $\cos C = \frac{a^2 + b^2 - c^2}{2ab} = \frac{-1}{4}$ $LHS = 4\left(\frac{44}{64}\right) + 3\left(\frac{-1}{4}\right) = 2$	1 1 1
37.	<p>Number of ways = $1 \times 8 \times 7 \times 2$</p> $= 112$	2 1

38.	$\frac{(n+2)C_7}{(n-1)P_4} = \frac{13}{24}$ $\frac{(n+2)(n+1)n(n-1)!}{(n-1)!7!} = \frac{13}{24}$ $(n+2)(n+1)n = 15 \times 14 \times 13$ $n = 13$	1 1 1
39.	$\text{Rank} = \frac{5}{2!} \times 5! + \frac{0}{2!} \times 4! + \frac{0}{2!} \times 3! + \frac{1}{0!} \times 2! + \frac{1}{0!} \times 1! + \frac{0}{0!} \times 1! + 1$ $= 303$	2 1
40.	$3^{600} = (3^2)^{300} = 9^{300} = (10-1)^{300}$ $= 300C_0(10)^{300} - 300C_1(10)^{299} + 300C_2(10)^{298} - \dots$ $- 300C_{299}(10)^1 + 300C_{300}(10)^0$ $= (10)^{300} - 300(10)^{299} + \dots - 3000 + 1$ <p>The last two digit is 01</p>	1 1 1
SECTION – IV		
41.	<p>(a) $n(A \times A) = 16$</p> $= n(A) \times n(A) = 16, \Rightarrow n(A) = 4$ $S = \{(a, b) \in A \times A : a < b\}$ <p>Given $S = \{(-1, 2), (0, 1)\}$</p> <p>Remaining of $S = \{(-1, 0), (-1, 1), (0, 2), (1, 2)\}$</p>	2 3
	<p>(b) $\frac{7+x}{(x^2+1)(x+1)} = \frac{A}{x+1} + \frac{Bx+c}{x^2+1}$</p> $x+7 = A(x^2+1) + (Bx+c)(x+1)$ <p>put, $x = -1 \Rightarrow A = 3$</p> $x = 0 \Rightarrow C = 4$ $x = 1 \Rightarrow B = -3$ $\frac{7+x}{(x^2+1)(x+1)} = \frac{3}{x+1} + \frac{-3x+4}{x^2+1}$	1 3 1
42.	<p>(a) Let $y = 3x - 5$</p> $x = \frac{y+5}{3}$ $g(y) = \frac{y+5}{3}$ $f \circ g(y) = f(g(y)) = y$ $g \circ f(x) = g(f(x)) = \frac{3x}{3} = x$ <p>$f \circ g = I_y$ and $g \circ f = I_x$</p> <p>f and g are bijection and inverse to each other. f is bijective.</p> $f^{-1}(y) = \frac{y+5}{3}$ $f^{-1}(x) = \frac{x+5}{3}$	1 1 1 1 1
	<p>(b) $x^2 + y^2 = 25$</p> $y = \pm \sqrt{25 - x^2}$	

